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CLEAN UNMARKED COPY OF AMENDED CLAIMS

(11 pages including this cover sheet)

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1 **CLAIM 1 (nce amended)** A method for making a coordinated and complementary set
2 of holograms to be used in a system for recording and projection of images in
3 substantially 3-dimensional format, said method comprising the steps of:

4 producing the reference beam by passing diffuse coherent light from a laser through
5 the first active optical system containing a plurality of image focusing means
6 therein; and

7 producing the object beam by passing diffuse coherent light from the same laser
8 through a second active optical system containing a plurality of image focusing
9 means therein of the same number and arrangement as the first active optical
10 system, the F-number of each said focusing means of the second active optical
11 system being the same as the F-number of the first active optical system, and each
12 said focusing means of the first optical system, wherein all of the component parts
13 of an equation used for determining the F-number of the second optical system are
14 substantially the same multiples of all of the component parts used for
15 determining the F-number of the first active optical system, respectively, said
16 multiple being equal to the expected magnification of the 3-dimensional image.

17 **CLAIM 2 (once amended)** A method according to claim 40 wherein a movable aperture
18 is made a part of each of said two active optical systems such that the size and shape of
19 the aperture of the first active optical system is the same as an elemental image of the
20 unmagnified integral photograph and the size and shape of said aperture of the second
21 active optical system is the same as an elemental image of the magnified integral
22 photograph, said movable aperture being placed between the diffuser plate of each of the

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1 image focusing means contained in the active optical system and adjacent to the surface
2 of the diffuser plate, and said method comprising the steps of:

3 positioning said movable aperture in the first active optical system so that it coincides
4 with the position of the first elemental image of the unmagnified integral
5 photograph; and,

6 positioning said movable aperture in the second active optical system so that it
7 coincides with the position of the first elemental image of the magnified integral
8 photograph; and,

9 producing the reference beam by passing diffuse coherent light from a laser through
10 the first active optical system; and,

11 producing the object beam by passing diffuse coherent light from the same laser
12 through the second active optical system; and,

13 allowing the reference and object beams to impinge upon the photographic plate for a
14 sufficient time to expose the hologram; and,

15 thereafter, positioning said movable aperture in the first active optical system so that
16 it coincides with the positions of the second elemental image of the unmagnified
17 integral photograph, the third elemental image of the unmagnified integral
18 photograph, the fourth elemental image of the unmagnified integral photograph,
19 and so on, each positioning of the aperture comprising a step in the process; and,

20 at the same time, positioning said movable aperture in the second active optical
21 system so that it coincides with the positions of the second elemental image of the
22 magnified integral photograph, the third elemental image of the magnified integral

1 photograph, the fourth elemental image of the magnified integral photograph, and
2 so on, each positioning of said aperture comprising a corresponding simultaneous
3 step in the process; and,

4 for each corresponding step, produce the reference and object beams and in the same
5 manner as they were produced for the first elemental position; and,

6 for each corresponding step, expose the same hologram in the same manner as it was
7 in the previous steps, making sure that both apertures always move together.

8 **CLAIM 9 (once amended)** A method according to claim 2 of preparing a hologram to be

9 used for elemental image multiplexing in a system for recording and projection of
10 images in substantially 3-dimensional format, said method comprising the steps of:

11 positioning a first movable aperture in the unmultiplexed image plane so that it
12 coincides with the position of the first elemental image of the unmultiplexed
13 integral photograph; and,

14 positioning a second movable aperture in the multiplexed image plane so that it
15 coincides with the position of the first elemental image of the multiplexed
16 integral photograph; and,

17 producing the reference beam by passing diffuse coherent light from a laser
18 through the first aperture; and,

19 producing the object beam by passing diffuse coherent light from the same laser
20 through a second aperture; and,

21 allowing the reference and object beams to impinge upon the photographic plate
22 for a sufficient time to expose the hologram; and,

1 thereafter, positioning the first movable aperture in the unmultiplexed image plane
2 so that it coincides with the positions of the second elemental image of the
3 unmultiplexed integral photograph, the third elemental image of the
4 unmultiplexed integral photograph, the fourth elemental image of the
5 unmultiplexed integral photograph, and so on, each positioning of the aperture
6 comprising a step in the process; and,

7 at the same time, positioning the second movable aperture in the multiplexed
8 image plane so that it coincides with the positions of the second elemental
9 image of the multiplexed integral photograph, the third elemental image of the
10 multiplexed integral photograph, the fourth elemental image of the
11 multiplexed integral photograph, and so on, each positioning of the aperture
12 comprising a corresponding simultaneous step in the process; and,

13 for each corresponding step, produce the reference and object beams and in the
14 same manner as they were produced for the first elemental position; and,

15 for each corresponding step, expose the same hologram in the same manner as it
16 was in the previous steps, making sure that both apertures always move
17 together.

18 **CLAIM 12 (once amended)** A method according to claim 39 of preparing a hologram to

19 be used as a front projection holographic screen for reconstructing magnified 3-
20 dimensional images projected from unmagnified integral photographs or holograms,
21 wherein at least three monochromatic laser beams are used to prepare the hologram,

1 such that the three wavelengths of laser light are complementary so as to produce the
2 appearance of white light, said method comprising the steps of:

3 optically splitting the first monochromatic laser beam into a reference beam and
4 an object beam such that the reference beam has a spherical wavefront that
5 appears to have been generated at a reasonably large distance and the object
6 beam has a cylindrical wavefront that appears to have been generated at a
7 calculated distance (a focal point for that wavelength); and,

8 exposing a transparent photographic plate with said monochromatic laser light
9 such that the reference beam impinges on the emulsion side of the
10 photographic plate while the object beam impinges on the side opposite from
11 the emulsion, in such a manner wherein the reference beam exposes the entire
12 plane of the photographic plate in all directions, and the object beam results
13 from a line of light that extends across the entire photographic plate in the
14 linear dimension and a distance f from the surface of the emulsion, said
15 distance f being calculated as the focal length from the required ($F/\#$) of the
16 screen focusing elements; and,

17 repeating the previous two steps for the second monochromatic laser beam such
18 that the line of light exposed by the object beam is adjacent to and parallel to
19 the line of light exposed by the first monochromatic laser, such that the two
20 lines are not coincident; and,

21 repeating the first two steps for the third monochromatic laser beam such that the
22 line of light exposed by the object beam is adjacent to and parallel to the line

1 of light exposed by the second monochromatic laser, such that it is not
2 coincident with the line produced by either the first or second monochromatic
3 laser; and,

4 repeating all of the above steps to ultimately form a number of parallel adjacent
5 sets of three adjacent parallel lines produced by the three monochromatic laser
6 beams so that they may repeat in groups of three across the entire
7 photographic plate.

8 **CLAIM 23 (once amended)** A method according to claim 38 of preparing a hologram to
9 be used in a system for recording and projection of images in substantially 3-
10 dimensional format as a high quality holographic imaging system to transfer low
11 aberration and low distortion images, said method comprising the steps of:

12 passing coherent light emanating from a laser through a first diffusing screen and
13 further passing the resulting scattered coherent light through a standard
14 projection lens that neither magnifies nor demagnifies, wherein the resulting
15 coherent light becomes the reference beam; and,

16 passing coherent light emanating from the same laser through a second diffusing
17 screen and further passing the resulting scattered coherent light through a high
18 quality lens system specially designed to be aberration and distortion free,
19 wherein the resulting coherent light becomes the object beam; and,
20 exposing the photographic plate with both reference and object beams to produce
21 the hologram.

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1 **CLAIM 30 (once amended)** A method of making a hologram capable of reconstructing
2 an image in substantially 3-dimensional format when used with an active optical
3 system containing a plurality of image focusing means therein, said method
4 comprising the steps of:

5 passing a laser beam through a standard lens so as to produce the reference beam;

6 and,

7 illuminating an integral photograph using the same laser; and,

8 projecting said laser illuminated image of the integral photograph onto a diffuser

9 plate so as to produce the object beam; and,

10 allowing the reference and object beams to pass through an aperture or slit, and

11 impinge together upon the surface of a photographic film or plate for a

12 sufficient time for photographic exposure.

13 **CLAIM 33 (once amended)** A method according to claim 38 of preparing a second

14 integral photograph to be used in a system for recording and projection of images in

15 substantially 3-dimensional format, from a first integral photograph wherein said first

16 integral photograph used together with an active optical system comprising a plurality

17 of image focusing means therein reconstructs a 3-dimensional image that is

18 pseudoscopic, and wherein said second integral photograph used together with an

19 active optical system comprising a plurality of image focusing means therein

20 reconstructs a 3-dimensional image that is orthoscopic, said method comprising the

21 steps of:

1 reconstructing a pseudoscopic real image from the first integral photograph using
2 an active optical system comprising a plurality of image focusing means
3 therein; and,
4 photographing the pseudoscopic real image onto a photographic film or plate
5 using an identical active optical system comprising a plurality of image
6 focusing means therein as was used to reconstruct the pseudoscopic real image
7 from said first integral photograph.

8 **CLAIM 34 (once amended)** A method according to claim 38 of preparing a hologram to
9 be used in a system for recording and projection of images in substantially 3-dimensional
10 format, from an integral photograph wherein said integral photograph used together with
11 an active optical system comprising a plurality of image focusing means therein
12 reconstructs a 3-dimensional image that is pseudoscopic, and wherein said hologram
13 reconstructs a 3-dimensional image that is orthoscopic, said method comprising the steps
14 of:

15 illuminating the integral photograph with coherent radiation from a laser, thereby
16 producing an object beam by reconstructing a pseudoscopic real image from said
17 integral photograph using an active optical system comprising a plurality of image
18 focusing means therein; and,
19 producing a reference beam using the same laser as was used to illuminate the integral
20 photograph; and,
21 exposing a photographic plate or film using the reference and object beams so
22 produced.

1 **CLAIM 35 (once amended)** A method according to claim 38 of preparing a second
2 hologram to be used in a system for recording and projection of images in
3 substantially 3-dimensional format, from a first hologram wherein said first hologram
4 reconstructs a 3-dimensional image that is pseudoscopic, and wherein said second
5 hologram reconstructs a 3-dimensional image that is orthoscopic, said method
6 comprising the steps of:

7 illuminating said first hologram with coherent radiation from a laser, thereby
8 producing an object beam by reconstructing a pseudoscopic real image; and,
9 producing a reference beam from the same laser as was used to illuminate said
10 first hologram; and,
11 exposing a photographic plate or film using the reference and object beams so
12 produced.

13 **CLAIM 36 (new claim)** The method according to claim 1 wherein a coordinated and
14 complementary set of holograms is produced whereby said coordinated and
15 complementary set of holograms, once produced, is capable of accepting as its input
16 reference beam an optical wavefront from a 3-dimensional scene and of reconstructing
17 as its output object beam an optical wavefront from said 3-dimensional scene in
18 magnified format such that the magnification is the same in all three-dimensions.

19 **CLAIM 37 (new claim)** The method according to claim 1 wherein a single hologram is
20 produced whereby said hologram, once produced, is capable of accepting as its input
21 reference beam an optical wavefront from a 3-dimensional scene and of reconstructing

1 as its output object beam an optical wavefront from said 3-dimensional scene in
2 magnified format such that the magnification is the same in all three-dimensions.

3 **CLAIM 38 (new claim)** The method according to claim 36 wherein only some of the
4 elements comprising said first and second active optical systems are holograms, the
5 remaining elements of said first and second active optical systems being comprised of
6 other types of optics.

7 **CLAIM 39 (new claim)** The method according to claims 36, 37, or 38 wherein a
8 hologram is prepared by exposing portions of a photographic plate incrementally until
9 the entire hologram is produced.

10 **CLAIM 40 (new claim)** The method according to claim 39 wherein movable apertures
11 are used to expose said portions of said photographic plate incrementally until the
12 entire hologram is produced and are used to protect other portions of said
13 photographic plate from being exposed.

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CLAIM HISTORY

(3 pages including this cover sheet)

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<u>CLAIM NUMBER</u>	<u>CLAIM HISTORY</u>
1	Once Amended (05/14/2003)
2	Once Amended (05/14/2003)
3	Original Claim - Unamended
4	Original Claim - Unamended
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7	Original Claim - Unamended
8	Original Claim - Unamended
9	Once Amended (05/14/2003)
10	Original Claim - Unamended
11	Original Claim - Unamended
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13	Original Claim - Unamended
14	Original Claim - Unamended
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27	Original Claim - Unamended	
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29	Original Claim - Unamended	
30	Once Amended (05/14/2003)	←
31	Original Claim - Unamended	
32	Original Claim - Unamended	
33	Original Claim - Unamended	
34	Once Amended (05/14/2003)	←
35	Once Amended (05/14/2003)	←
36	New Claim (05/14/2003)	←
37	New Claim (05/14/2003)	←
38	New Claim (05/14/2003)	←
39	New Claim (05/14/2003)	←
40	New Claim (05/14/2003)	←